

## ***Interactive comment on “Review article: Potential application of surface methods for the monitoring of organic matter dynamics in marine systems” by Galja Pletikapić and Nadica Ivošević DeNardis***

**Anonymous Referee #2**

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General comments In the ms the authors present a review and a demonstration of the applicability of electrochemical (chronoamperometry) and AFM methods to the study of organic matter dynamics in marine systems: 2 case studies are considered. The authors discuss the potentials of non-invasive surface method which should be suitable to study the organic carbon down to the nano/microscale both for studying the aggregation of organic aggregates (northern Adriatic sea study case) and in the oil spill in the coastal water (South Adriatic sea study case). Although the chronoamperometric and atomic force microscopy have wide potential for the study and monitoring of the dynamics of organic matter in marine systems the ms has a main weakness: it is not a complete review and it does not demonstrate soundly the applicability to the marine

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environment in the two case studies considered. I strongly suggest clarifying the aims of the ms: is it a review of the methods which deals with the applications in the marine environment of chronamperometry and AFM or it wants to demonstrate the applicability considering two case studies? In the first case other studies should be considered (e.g.: Guo et al., 1998; Nishino et al., 2004; Villacorte et al., 2015); in the second case a more robust presentation of the results obtained in the case studies should be presented and further discussed. The organization of the chapters needs to be revised as it is not consequential, moreover when presenting the case studies the emphasis should be more on the kind of organic matter and dynamic process that was investigated in the different areas than on the location of the studies. The authors state that the methods are “non-invasive” and “do not need any sample pretreatment” however they do not provide sufficient information on the time between the sampling and the measurements, were the samples preserved or not?, were the analyses performed on board of the vessel used for the surveys? could changes have occurred in the natural samples after collection, prior to the analytical measurements? In the presentation of the North Adriatic case study there are many references to the “Project Jadran” which is not available through publications or web site. I strongly suggest presenting the data in order to better sustain the case studies or to specify that are unpublished data. The ms is interesting and it could be considered for publication In NEHSS after a major revision which includes a re-organization of the ms.

**Specific comments** The Title is not representative of work presented as the ms describe some application of methods to the monitoring of organic matter dynamics in marine systems. The term surface methods is misleading as one could expect that they are applicable only to surface water monitoring whereas the term refer specifically to the analytical method. In the Abstract (P.1 L.14, P.3 L.23) “raw seawater samples” is used; do the author refer to natural seawater samples? In affirmative case they could omit the term “raw” which could be misleading. In the Introduction (P.1 L. 22) “DOM is mainly produced by primary production” should be changed as the DOM can be produced by phytoplankton, macrophytes, marine plants through primary production In the Introduc-

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tion (p. 2 L. 16-24) Studies of TEP distribution have been carried out also in Adriatic sea, the authors should consider these studies as their case studies refer specifically to the Adriatic sea: Radić T, Kraus R, Fuks D, Radić J, Pecar O. 2005. Transparent exopolymeric particles' distribution in the northern Adriatic and their relation to micro-phytoplankton biomass and composition. *Sci Total Environ.*353(1-3): 151-61. Schuster S., Herndl G. J. 1995. Formation and significance of transparent exopolymeric particles in the northern Adriatic Sea. *Mar Ecol Prog Ser* 124: 227-236. When the authors state that "giant aggregates (> 1m) observed by a scuba diver" they should be aware that as many studies are cited the observations were carried out by different scuba divers. Check and correct the name of the authors of the references as there are errors. (P. 2 L. 23). In the section 2.1 Electrochemical methods: The meaning of the sentence is unclear: "atomically smooth" and "fluid chemically inert with a large set of interfacial data in various aqueous electrolyte solutions" (P. 4 L. 1-3). Molecular adsorption, adhesion, spreading and particle collisions are processes I suggest to avoid the term "phenomena" (P.4 L.14-16). "diesel oil (D2)" : specify the meaning as it is a type of diesel oil (P. 8 L. 28). In the conclusions (P. 10 L. 13-14) "Possible application. ... Include ...and monitoring of organic pollution ". I would suggest to substitute "organic" with "oil" as the authors did not consider other organic pollutants. In the references "kucuckcekmece" bay the first letter should be capital (P. 14 L.29). The quality of the figures needs to be improved. The Map in figure 1b is not readable. In the Figure 2, most of the titles of the graphs are not readable. In the caption of Figure 4 "analysis of raw seawater" I suggest to delete "raw" or to use "natural". The reference to not available sources is not common practice in scientific journals. I suggest presenting and using the data to better sustain the applicability in the case studies presented. In the figure 5, I suggest separating the presentation of the methods used and from the part regarding their application to study the dynamics of organic matter.

Cited references Guo L., Santschi P.H., Balnois E., Wilkinson K.J., Zhang J., Buffle J. 1998. Fibrillar polysaccharides in marine macromolecular organic matter as imaged by atomic force microscopy and transmission electron microscopy. *Limnol. Oceanogr.*

43(5): 896-908. Nishino T., Ikemoto E., Kogure K. 2004. Application of Atomic Force Microscopy to Observation of Marine Bacteria. *Journal of Oceanography*, 60: 219–225. Villacorte, L. O., Ekowati, Y., Neu, T. R., Kleijn, J. M., Winters, H., Amy, G. L., S., Jan C., Kennedy, M. D. Characterisation of algal organic matter produced by bloom-forming marine and freshwater algae *Water Research* 73:216-230 .

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